



UNIVERSITY OF RUHUNA
FACULTY OF GRADUATE STUDIES

Master of Business Administration Degree Programme Semester II
Examination (July/August 2021)
Academic Year 2020/2021

PDBA/MBA 108: Operations Management

Duration: Three hours

Non programable calculators are allowed.

The Question Paper contains seven (07) questions.

Answer only Five (05) Questions.

Q1

- i. "Every aspect of a business is affected by its operations. Operations management enables a company to be efficient and effective by using the fewest resources and meeting customer demands". Critically evaluate this statement with an example.
(06 marks)
- ii. "Mass customization and rapid product development are identified as challenges to modern manufacturing operations". Explain this statement with examples.
(06 marks)

(Total 12 marks)

Q2

- i. The following information extracted from a biscuit manufacturing company.

Week	Output (units)	Workers	Material (Kgs)
1	35000	8	475
2	44500	10	580
3	42800	10	570
4	48000	12	675

Assume 40-hours per week and an hourly wage of Rs. 125. Overhead is 1.5 times weekly labor cost. Material cost is Rs. 275 per Kg.

- a. Compute the multifactor productivity measure for each of the weeks.
(02 marks)
- b. What do the productivity figures suggest?
(02 marks)

- ii. The following table contains the number of complaints received in a supermarket for the first six months of operations.

Month	Number of complaints
June	45
July	54
August	38
September	42
October	50
November	65

- a. Estimate number of complaints of July through December using exponential smoothing with α of 0.3 and a June forecast of 47 complaints.

(03 marks)

- b. Compute the tracking signal for June through November.

(03 marks)

- c. Discuss whether your forecasting method is giving good predictions.

(02 marks)

(Total 12 marks)

Q3

The Faculty of Graduate Studies has developed an eight-step process for screening the applications of MBA program. The faculty has decided that the best way to take these applications is by employing a line process. The following table shows the times and predecessors for the required tasks.

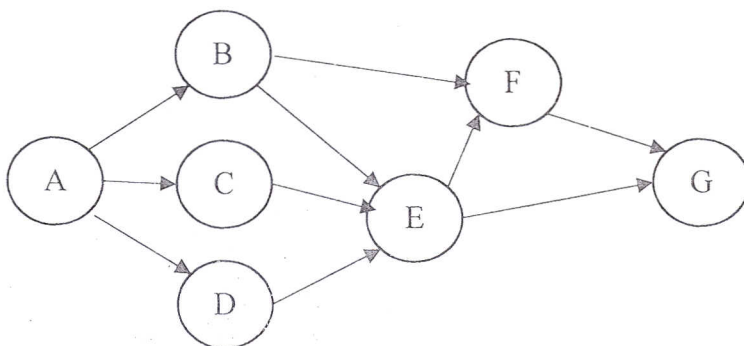
Task	Immediate predecessor	Time (Minutes)
L	-	1.2
M	L	1
N	M	0.6
O	M	1.05
P	N	1.3
Q	O	0.75
R	O	0.85
S	P, Q, R	0.95



- i. Draw a precedence diagram for the tasks. (02 marks)
 - ii. Determine the desired cycle time if the faculty needs to produce 30 applications per hour. (01 mark)
 - iii. Calculate the theoretical minimum number of workstations. (01 mark)
 - iv. Balance the line using the longest operating time as a primary rule. (03 marks)
 - v. Calculate the efficiency of the line. (02 marks)
 - vi. What is the possible fastest cycle time for the given tasks listed above? (01 mark)
 - vii. What is the maximum hourly output that can be achieved by a single line? (02 marks)
- (Total 12 marks)**

Q4.

Network diagram for the development of a new communication system project and probabilistic activity times are given below.



Activity	Time Estimates (Days)		
	Optimistic time (a)	Most likely time (m)	Pessimistic time (b)
A	4	8	12
B	2	5	8
C	4	6.5	9
D	5	8	14
E	7	7	7
F	1	2.5	4
G	3	4	5

- i. Calculate the expected time of each project activity. (02 marks)
- ii. Calculate the variance of each project activity. (02 marks)
- iii. Calculate the total slack of each project activity. (04 marks)
- iv. What is the critical path? (02 marks)
- v. What is the expected time duration of the project in days? (02 marks)

(Total 12 marks)

Q5

Toyota Motor Corporation invented lean production (also known as the Toyota Production System or Toyota Manufacturing System), which has triggered a global transformation in every industry to Toyota's manufacturing philosophy and methods over the last decade.

Explain the key considerations of Lean Systems and how the Lean System differs from Western scientific management practices.

(Total 12 marks)

Q7

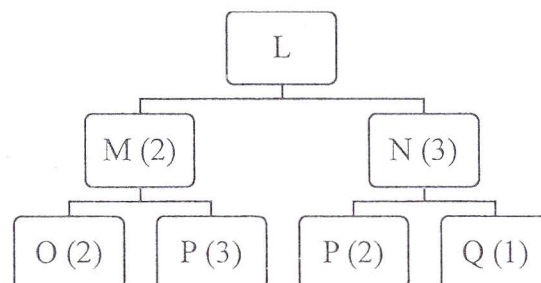
- i. SY Company sells its own products as well as products made by other companies. One of these products is the F125 power tool machines. The following information are extracted from the records of SY Company.

Estimated annual demand	250 machines (50 weeks per year)
Cost	Rs. 7250 per machine
Lead time	2 weeks
Standard deviation of weekly demand	1
Standard deviation of lead time	0.25 weeks
Holding cost per unit per year	5% of item cost
Ordering cost	Rs. 250
Desired service level	95% ($Z = 1.65$)



- a. Calculate the economic order quantity (EOQ) for the power tool machines.
(01 mark)
- b. Calculate annual ordering and holding costs (ignoring safety stock) for the EOQ.
(02 marks)
- c. What is the reorder point for the power tool machines?
(02 marks)
- d. How much of the reorder point consists of safety stock?
(01 mark)
- ii. The bill of materials (BOM) and the data from inventory records for product L are shown in following figure and table.

Bill of Materials



Note: numbers within brackets represent quantities per assembly.